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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/825,801

04/01/2004

Gerald W. Iseler

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9089

26902 7590 01/05/2007

DEPARTMENT OF THE AIR FORCE

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2240 B ST., RM. 100

WRIGHT-PATTERSON AFB, OH 45433-7109

EXAMINER

SONG, MATTHEW J

ART UNIT

PAPER NUMBER

1722

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

01/05/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/825,801

Applicant(s)

ISELER ET AL.

Examiner

Matthew J. Song

Art Unit

1722

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 16 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 11-15 and 20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 11-15 and 20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/16/2006 has been entered.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claim 20 is rejected under 35 U.S.C. 102(b) as being anticipated by Golding et al (US 5,686,351).

Golding et al discloses a semiconductor crystal comprising GaSb (col 5, ln 5-20 and Fig 1).

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 11-13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al (US 5,769,944) in view of Kurosawa et al (JP 405097573 A), an English Abstract has been provided.

Park et al discloses a vertical gradient freeze (Bridgman) crystal growth apparatus having a means for applying a magnetic field comprising a vessel 61 for holding a seed crystal 1 (Fig 1 and col 6, ln 1-20). Park et al also discloses a gold thin film 33 is coated on the inner surface of the inner tube 31a of the double 31 (col 4, ln 30-65 and Fig 2), this gold film clearly suggests applicant's outer electrode. Park et al also teaches a furnace comprising a heating coil to heat the charge (col 4, ln 25-65), this clearly suggest applicant's heating means. Park et al also teaches providing an electromagnet to the electric furnace to effectively apply a magnetic field, this clearly suggests applicant's means for applying voltage to an induction coil to impose a magnetic field.

Park et al does not teach a small inner elongated electrode mounted within the vessel at or near the vertical axis thereof, which extends into the charge but does not contact the crystal.

In a Bridgman apparatus, Kurosawa et al teaches an electrode is immersed in a melt and an thermoelectromotive force generating between the crucible and the electrode to prevent damage to the crucible during growth and a means for generating an electric current in the melt (Abstract and Fig 1).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Park et al by using an immersed electrode and applying voltage to the electrode as taught by Kurosawa et al to limit damage to the crucible.

In regards to the limitation requiring a means for applying a voltage to the coil to impose a magnetic field lines in the melt such that the flow of the radial electric current crosses the magnetic filed line to impart a stirring force to the melt, this limitation is merely an intended use of the apparatus. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. The combination of Park et al and Kurosawa et al teaches all of the structural limitations of the apparatus, thus would be capable of performing the claimed intended use.

Referring to claim 12, the combination of Park et al and Kurosawa et al teaches an electric voltage between the crucible and the electrode, this clearly suggests the crucible walls serves an electrode.

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Referring to claim 13, the combination of Park et al and Kurosawa et al teaches coil, which is capable of the claimed intended use of a heater means and induction coil.

Referring to claim 15, the combination of Park et al and Kurosawa et al teaches a furnace lifting/lowering device ('944 col 4, ln 1-20) and temperature control units ('944 col 5, ln 1-35).

6. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al (US 5,769,944) in view of Kurosawa et al (JP 405097573 A), an English Abstract has been provided, as applied to claims 11-13 and 15 above, and further in view of Niikura et al (US 5,700,321).

The combination of Park et al and Kurosawa et al teaches all of the limitations of claim 14, as discussed previously, except an electrode with inner annular spaces, an upper charge and a heater.

In an apparatus for crystal growth, note entire reference, Niikura et al teaches an electrode with inner annular spaces, an upper charge (i.e. melt raw material) and a heater used to replenish a crystal growth melt (Abstract and Fig 3).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the apparatus taught by the combination of Park et al and Kurosawa et al by using the replenishment means taught by Niikura et al to increase the amount of crystal product from the apparatus.

### ***Response to Arguments***

7. Applicant's arguments with respect to claims 11-15 and 20 have been considered but are moot in view of the new ground(s) of rejection.

8. Applicant's arguments filed 10/16/2006 have been fully considered but they are not persuasive.

Applicant's argument that only the electrode of Kurosawa can conduct electricity and Park's quartz crucible defined by tubes and 60 & 61 does not conduct electricity is noted but not found persuasive. First, Park is not limited to a quartz crucible and it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Park by using a crucible of a different material to achieve the effect desired by Kurosawa. Kurosawa et al teaches generating a voltage between the crucible and the electrode, thus it would be obvious to use a crucible of a suitable material to achieve the electrical voltage. Furthermore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Park et al by using a Pt crucible, which conducts electricity, and is taught by Kurosawa et al to grow an oxide crystal ('573 Abstract). Second, Park does not state that the reaction container is quartz. Park is silent to the material of the reaction container (col 6, ln 1-67); therefore constructing the reaction vessel of any conventionally known material, such as Pt, as taught by Kurosawa would have been obvious to one of ordinary skill in the art at the time of the invention. Finally, Park et al teaches a gold film and a tube of stainless steel, which are capable of conducting electricity and acting as the outer electrode ('944 col 4, ln 30-50).

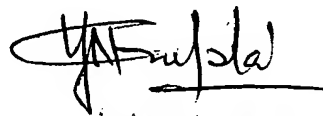
### ***Conclusion***

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9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J. Song whose telephone number is 571-272-1468. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yogendra Gupta can be reached on 571-272-1316. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Matthew J Song  
Examiner  
Art Unit 1722

YOGENDRA K. GUPTA  
SUPERVISORY PATENT EXAMINER  
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MJS  
December 30, 2006